

to QS. But, as Mr. S. S. Hough has kindly pointed out to me, the zero should be found as previously indicated by setting on the polar star to be measured, and whilst the clock is driving the instrument, moving the telescope in declination until the star keeps on the wire. The zero found in this manner is freed from all errors due to instrumental causes having  $\tan \hat{c}$  or  $\sec \hat{d}$  as a factor, and the necessity to compute  $Q$  is evaded.

With instruments such as the McClean and 7-inch refractors of this observatory, where the hour circles show right ascensions direct, the difference between the instrumental R.A. and the star's R.A. gives  $15 \Delta \alpha$  at once.

This method gains in accuracy as the star is nearer the pole. It is easily seen that it is applicable even if the star is situated between the pole of the sky and the pole of the instrument. All but the very minute differential effect of flexure is eliminated.

Finally, by using the above method for polar stars and the diurnal motion method for other stars, it is apparent that in neither case is a knowledge of the instrumental constants necessary in the measurement of double stars.

*Royal Observatory, Cape of Good Hope:*  
1901 January 11.

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*Further Corrections to the Armagh Catalogue, with Special Reference to the "Anonymous" Stars.* By J. L. E. Dreyer, Ph.D.

Shortly after I had communicated to the Society the list of corrections which appeared in the *Monthly Notices* for November (p. 10), Dr. Ristenpart, who is engaged in the preparation of a general catalogue of stars, kindly sent me a list of Corrigenda, chiefly referring to wrong degrees or minutes and similar errors. At the same time he requested me to examine the original records in order to solve a number of questions, chiefly concerning the identity of the "anonymous" stars in the Armagh Catalogue. I gladly complied with this request, as the publication of the invaluable star catalogues of the *Astronomische Gesellschaft* has now made it possible to decide many cases of doubtful identity which formerly could only have been cleared up by new observations. Some of the suggestions made by Dr. Ristenpart turned out to be correct, or at least to be very plausible; but frequently the examination of the original observations revealed very curious errors, which could never have been suspected by anyone who had not access to the originals. Many of these errors were caused by the fact that the R.A. and P.D. were observed with different instruments, and most of them could have been avoided by greater care on the part of the observers in describing the star observed and others near it, as well as in recording degrees and minutes.

In a number of cases it is necessary to assume that the observer with the transit instrument has set on a star of south instead of north declination, and *vice versa*. Up to 1844 the setting was made by either of two 6-inch setting circles at the eye end of the transit instrument, one giving altitudes, the other zenith distances, but as the working lists have not been preserved, I am unable to say whether these gave altitude (or Z.D.), or whether the observer had perhaps to find this mentally from the Decl. or P.D. of the star, though this is hardly likely to have been the case. As there is no clamp, the instrument may sometimes have been slightly displaced without the observer's knowledge, and a wrong star may have been observed in consequence.

When corrected for the errors given in the following pages, the Armagh Catalogue ought to be free from all gross errors, with the exception of one or two cases, in which I was unable to find a plausible correction.

The references Berlin, Leipzig, Harvard, &c. are to the A.G. Zone Catalogues.

94. Minutes of P.D. are 58' (error of reduction).

118. R.A. belongs to  $+14^{\circ}78$  (P.D.  $75^{\circ}34'$ ). The P.D. corrected by  $-1'$  (error of obs.) is that of  $+14^{\circ}89$ , R.A. being  $0^{\text{h}}32^{\text{m}}12^{\text{s}}$ .

176 and 177 P.D. is  $63^{\circ}$ .

192. Error of reduction. R.A. should be for  $1845^{\circ}0^{\text{h}}46^{\text{m}}57^{\text{s}}.83$ . It is probably  $=+23^{\circ}126$ , the observer having set  $1^{\circ}$  wrong. If so we have for  $1840^{\circ}0^{\text{h}}46^{\text{m}}41^{\text{s}}.88$  (P.D.  $66^{\circ}19'$ ) in good accordance with Berlin B. 285.

234. Minutes of P.D. must be 33 instead of 29 (Schj. 367). No minute in original obs.

272. P.D. is  $17^{\circ}$ .

302 = 303. In the latter there is an error of reduction ; the seconds should be  $27''53$ .

314. P.D. is  $46^{\circ}$ .

321 is marked "Comet star *e*." No magn. in original obs. except on November 23, 1845 : "Very faint,  $\alpha = 1^{\text{h}}19^{\text{m}}$ ." Error of reduction, R.A. should be  $1^{\text{h}}20^{\text{m}}12^{\text{s}}.63$ , and the minute ought to be 19, as the star is B.W.  $1^{\text{h}}333 = \text{Gött. } 312$ .

469. Seconds of R.A. should be  $24^{\text{s}}25$ , error of reduction.

476. Seconds of P.D. should be  $14''52$  (assumed place wrong).

492. Dr. Ristenpart suggests that if the P.D. is assumed to be  $59^{\circ}30'$  instead of  $56^{\circ}30' \pm$  the star is  $+30^{\circ}358 = \text{Leiden } 836$ . If so, the R.A. would become  $2^{\text{h}}6^{\text{m}}47^{\text{s}}.28$  or  $0^{\text{s}}.67$  less than Leiden, so that the identity is doubtful. Reductions correct.

515. Minutes of R.A. are 14.

610. Minutes of R.A. are 39.

623. Minutes of R.A. are 47.

659. Prec. in R.A. is  $3^{\text{s}}469$ , misprint.

819. Seconds of P.D. should be  $18''37$ . All the corrections are  $10''56$  too great.

873. R.A. ( $4^h 0^m 16^s.68$ , see errata) belongs to  $+54^\circ.745$  (P.D. =  $36^\circ 1'$ ). N.P.D. if corrected by  $+10'$  is that of No. 877. No error of reduction.

898. Observed 1849 February 13 (not January),  $3^s.26$  following  $50^\circ$  *Tauri*, therefore  $a$  is  $20^s.00$  too small, and  $\star = +20^\circ.725$ .

899. Error of reduction in  $a$ ; it should be  $4^h 7^m 39^s.69$  = No. 900 = G. 806. In P.D. the observer has altered the observed minute from 37 to 38, but if we reject this correction we get  $29^\circ 39' 18''.1$  in excellent accordance with G. 808 and Radcl. 1189 (R.A. =  $4^h 7^m 55^s$ ).

922. P.D. minute should be 35.

1087. Prec. in R.A. should be  $8^s.299$  (used in reductions).

1140. R.A. is  $1^s.00$  too great (error of reduction).

1170. Seconds of P.D. should be  $48''.63$  (error in assumed place).

1202. Prec. in R.A. is  $3^s.094$ , also an error of  $1^s$  in the reduction, so that R.A. becomes  $5^h 20^m 26^s.08$  (P.D. =  $88^\circ 55'$ ). Star is B.W.  $5^h.508$ .

1257. The R.A. is given for 1850. For 1840 it becomes  $5^h 29^m 16^s.90$ . Star is  $+7^\circ.952$ .

1266. Minutes of R.A. are 30.

1296. Prec. in R.A. is  $3^s.429$  (used).

1343. There are here two stars nearly on the same parallel,  $\Delta a = 23^s$ . Doubtless the P.D. belongs to the preceding one,  $+24^\circ.1039$  = Berlin B. 2074, which is for 1840  $65^\circ 24' 53''.3$ . R.A. =  $5^h 47^m 48^s$ .

1438. P.D. should be  $37''.93$  (error in changing "assumed place" from *Naut. Alm.* to A.S.C.).

1439. Observer has given  $a$  as  $6^h 17^m$ . I cannot find why the star was observed, nor why  $a$  was altered. It is therefore  $= +13^\circ.1250$  = Leipz. 2260. With correct precession we get  $76^\circ 48' 30''.58$ ,  $a = 6^h 17^m 38^s$ .

1450. P.D. should be  $18''.71$  (error of reduction).

1451. R.A. is  $6^h 18^m 13^s \pm$ .

1454. The minute observed is 16 (not 17), but it ought to be 15, as the star must be  $= +0^\circ.1405$ , P.D. being  $89^\circ 36'$ .

1490. Probably = 1491. Observed for a "Halley's comet star" with the note "not the star." With the constants and precession of 1491 the R.A. becomes  $6^h 24^m 40^s.12$ .

1494. The only star with this P.D. is  $+33^\circ.1328$  = B.W.  $6^h.517$ , the R.A. of which is  $6^h 17^m 41^s$ . The seconds of P.D. would be  $17''.77$ . Also observed for a comet star.

1498. Prec. in R.A. is  $3^s.915$ .

1503. R.A. of this and P.D. of 1509 belong together,  $= +33^\circ.1371$ , while the R.A. of 1509 belongs to  $+34^\circ.1416$ , P.D.  $55^\circ 34'$ .

1559. R.A. belongs to  $+8^\circ.1543$  = Leipzig II. 3300, P.D. =  $81^\circ 26'$ .

1561. The R.A. of this and the P.D. of 1559 form  $+8^\circ.1544$  = Leipzig II. 3303.

1594. Seconds of P.D. should be  $37''\cdot75$  (error of reduction).  
 1620. Dr. Ristenpart suggests that if corrected by  $-1^m$  this would be  $= +15^{\circ}\cdot1482 =$  Berlin A. 2643 (P.D.  $74^{\circ} 19'$ ). No error of reduction, observed for 45 *Geminorum*.

1628 is  $+15^{\circ}\cdot1496 =$  Berlin A. 2675, P.D.  $74^{\circ} 34'$ .

1630 is  $+15^{\circ}\cdot1497 =$  Berlin A. 2679. P.D.  $74^{\circ} 34'$ .

1655 P.D. degrees are  $86^{\circ}$  (misprint).

1839 Prec. in R.A. is  $4^s\cdot677$  (misprint).

1855 Minutes of R.A. are 11.

1911 } Seconds of R.A. are 44 and 46 ; corrections to P.D.

1912 } for precession are respectively  $-0''\cdot53$  and  $-0''\cdot61$ .

1917. The P.D. must belong to 41 *Canceri*, as P. 128 (observed with micrometer) is said to precede it.

1920. P.D.  $-1'$  makes the star  $= 1925$ . This error of observation equally affects 1922 (the  $\Delta\delta$  of which from 1920 was measured by the micrometer) which then is  $= 1923$ .

1921.  $\Delta\delta$  measured from 42 *Canceri* ; observer adds "north of two preceding." So it must be  $+20^{\circ}\cdot2165 =$  Berlin B. 3489.

1937. Observed with the micrometer as  $\alpha$  comes to  $\delta$  *Canceri*, but it is not stated whether it is  $p$  or  $f$ .  $\Delta N.P.D. = +22''\cdot2$ , but there must be some error of observation, as the star can only have been No. 1931, which then was  $65''$  south of  $\delta$  *Canceri*. No plausible correction to the recorded measure will, however, change  $22''$  into  $65''$ .

1946. Minute of P.D. is  $1'$ .

1965. The first two observations give the minute of P.D. as 19 and 29, while the third gives neither degree nor minute. It was observed for 52 *Canceri*, and must be either this star ( $73^{\circ} 24'$ ) or  $+16^{\circ}\cdot1834$  ( $73^{\circ} 14'$ ).

2002. Probably  $= 2001$  with an error of  $5'$ . If so, seconds become  $23''\cdot89$ .

2041 is  $= 2040$  with an error of  $1'$ .

2060. Dr. Ristenpart proposes to read  $103^{\circ} 3'\pm$  for  $103^{\circ} 54'\pm$ , the star being  $-13^{\circ}\cdot2825$ . The observer set for P. 39.

2162. Observed over six wires. Is it  $= 2160$  with an error of 20 in counting the seconds? Dr. Robinson remarked afterwards that there is no star in the place of 2162.

2238  $= +83^{\circ}\cdot296$ . I cannot make out how the places given in the Catalogue were found.  $\Delta\alpha$  from P. X. 22 :—

	<sup>s</sup>		<sup>s</sup>
Apparent	$-46\cdot17$	mean	$-46\cdot18$
	$46\cdot33$		$46\cdot34$
	$45\cdot67$		$45\cdot38$
	$46\cdot13$		$46\cdot14$

Place for 1840 :  $10^h 10^m 8^s\cdot26, 6^{\circ} 31'\cdot3$ .

2281. The observer set for 31 *Sextantis*. He notes : "Double, the large taken" (i.e. the sf one by a diagram). The star is

therefore  $\Sigma$  1440, and he must have set for  $-3^\circ$  instead of  $+3^\circ$ . P.D.  $93^\circ 5'$ .

2307 is=2308, Groombridge being  $30^s$  wrong.

2319=Schj. 3899, R.A.= $10^h 31^m 49^s$ .

2355. The R.A. is that of  $+70^\circ 635=A.\ddot{O}$ . 11184, the P.D. of which is  $19^\circ 16' 0$ , while the P.D. is that of  $+70^\circ 625=A.\ddot{O}$ . 11109, the R.A. of which is  $10^h 36^m 56^s$ .

2357. Minutes of P.D. are  $38'$ .

2395. The observer believed he had set for P.X. 221 and put down the P.D. of that star; but he must have set for  $90^\circ 41'$  instead of  $89^\circ 14' \pm$ , as the R.A. observed is that of Gött. 3585.

2398. P.D. should be  $90^\circ 42'$ , Gött. 3589. Note to this and 2395 in Second Armagh Catalogue to be cancelled.

2479=2478.

2520. R.A. is wrong. It precedes 92 *Leonis*  $1^m 16^s 42$  and is  $=+22^\circ 2387=Berlin B. 4323$ .  $11^h 31^m 11^s 15$ ,  $67^\circ 48' \pm$ .

2584. The observer remarks 1844 Apr. 16: "The large \* following is also bisected." This large star must have been 67 *Ursæ*, which has a P.M. of  $+0'' 060$  in P.D. and in 1844 was exactly on the parallel of  $+43^\circ 2177=Bonn 8308$ . Therefore this was the star observed with an error of  $5'$ , which error must also have been made in 1854, though perhaps it was 67 *Ursæ* which was observed 1854 April 1. The R.A. of 2584 is  $11^h 53^m 19^s$ , P.D.  $46^\circ 3' 58''$ .

2607. Dr. Ristenpart suggests that the observer set for  $-6^\circ 53' \pm$  instead of for  $+6^\circ$  and that the star is B.W.  $12^h 27'=Schj. 4390$ . Observed instead of 11 *Virginis*.

2611. Minute of R.A. should be  $2^m$ , no minute in original observations (=Radcliffe 2803).

2674. Observed instead of 2676. The R.A. of  $+37^\circ 2278$  in the Lund zones agrees well, but the P.D. of this star for 1840 is  $52^\circ 45'$ , so that even an error of  $10^\circ$  in setting would leave  $26'$  not accounted for. An error of  $1^\circ$  would bring us to Cambridge 6122 ( $64^\circ 11'$ ) but this differs more than a second in R.A.

2711. Seconds of P.D. are  $27'' 34$ , error of reduction.

2807. Seconds of R.A. should be  $29^s 68$ , P.D.  $61^\circ 31$ . Star is  $+28^\circ 2185=Cambridge 6356=Armagh 2805$ .

2815. P.D. must be  $99^\circ 57'$  as B.W.  $13^h 22$  seems the only star possible.

2909. Minutes of P.D. are  $33'$ , error of reduction.

3025. Minute of P.D. must be  $17'$  according to Berlin A. 5159.

3042. I cannot identify this star; reductions correct, except that the first R.A. should be  $33^s 24$ . Observed for P. xiv. 52.

3075. Dr. Ristenpart suggests that the instrument was set to P.D.  $40^\circ 30'$  instead of  $39^\circ 30'$ , and that the star is  $+49^\circ 2305$ .

3095. Minutes of P.D. are 53 (misprint).

3137. P.D. is  $57^\circ 19' 47'' 70$ , R.A.  $=14^h 47^m 39^s$ . The "corrections" must have been applied to a wrong "assumed place" when making up the final catalogue.



3178. Minutes of P.D. are 37', error of observation.  
 3212. Seconds of R.A. are  $38^s.61$ , error of reduction.  
 3425. Prec. in P.D. is  $8''.134$ .  
 3444. Correction should be  $-6''.99$  and seconds of P.D.  $42''.42$ .  
 3461. Minutes of P.D. are 28.  
 3544. P.D. is  $91^\circ 20' 11''.31$ ; the minute only noted once, and there is an error in the reduction to 1840.  
 3600. On p. 767 the figure 1 has dropped out ( $41''.87$ ).  
 3651. Observed for 6 *Sagitt.*, there seems no star possible except  $-15^\circ.4767$ , P.D.  $105^\circ 48'$ .  
 3674. Minutes of R.A. are 54.  
 3714. P.D. is  $77^\circ$ ; corrections  $+4''.43$  and  $+3''.13$ . Seconds  $2''.74$ .  
 3721. Dr. Ristenpart suggests that the instrument was set to  $39^\circ$  instead of  $33^\circ$ , in which case the star would be  $+50^\circ.2549 =$  Harvard 5526, P.D.  $39^\circ 5'$ . The conjecture is probably right, and the R.A. would then be  $18^h 11^m 30^s.95$ .  
 3729 = 3727 = L.L. 33792, Baily's R.A. being  $28^s$  out.  
 3745 would seem to be Schj. 6710, P.D.  $92^\circ 32'$ .  
 3758 Minutes of P.D. are  $51'$ .  
 3777. Dr. Ristenpart suggests that this is  $+22^\circ.3385 =$  Berlin B. 6500, P.D.  $67^\circ 20'$ .  
 3835. Minutes of R.A. are  $36 = 3831$ , error of reduction.  
 3844. Minute of R.A. must be 41. Schj. 6969.  
 3902. Dr. Ristenpart thinks that this is Schj. 7054, P.D.  $90^\circ 40'$  instead of  $87^\circ 40'$ . The error must have been in the working list, as the same wrong setting was made on two nights. Observed for 64 *Serpentis*.  
 3908. To be struck out. Simply a repetition of 3909.  
 3940. Degrees of P.D. are  $61^\circ$ , not 16. In original " $21^s.5$  p. P. 318."  
 3970. P.D. is  $63^\circ 25'.4$ .  
 3980. Dr. Ristenpart suggests that the P.D. was  $84^\circ 15'$  instead of  $94^\circ 15'$ , which would alter the seconds of R.A. to  $55^s.34$  and make the star = Leipzig. II. 9118.  
 3982. Minutes of R.A. are  $9^m, = -1^h.3701$ ; clerical error.  
 3985. P.D. must be  $70^\circ 2' \pm$ , seconds of R.A.  $5^s.09$ .  
 4003. There is an error of  $1^m$  in the first observation; single results are  $28^s.45$  and  $28^s.27$ . R.A. =  $19^h 9^m 28^s.36$  P.D.  $24^\circ 10'$ .  
 4043. P.D. is  $105^\circ 30'$ .  
 4088. Is a "comes preceding" to 10 *Cygni*,  $\Delta\delta$  measured  $1' 26''.53$ , not stated whether north or south. It must be  $+51^\circ.2157$ , south of 10 *Cygni*.  $19^h 24^m 29^s, 38^\circ 37' 55''.03$  in good agreement with Harvard 6035.  
 4100. Seconds of R.A. are 24. Munich<sub>2</sub> 8938.  
 4110. Dr. Ristenpart suggests that it is  $-2^\circ.5057$ , P.D.  $92^\circ 40'$ . Observed for P. xix. 183.  
 4163. Prec. in R.A. is  $2^s.824$ , misprint. P.D.  $78^\circ 28'$ .

4210 is G. 2978, and has been reduced on that supposition. By obs. it is  $2^m 13^s 33$  p. G. 2991, which gives  $19^h 49^m 58^s 12$ , which is  $4^s 0$  less than Radcliffe 4509. There must be an error in counting the seconds. Only three wires observed, which agree very badly.

4221. This star was observed in the usual way and G. 2984 was by micrometer found to be  $48'' 37$  south of it. There is an error of reduction, P.D. should be  $50^\circ 2' 41'' 10$ . It seems to be  $= +39^\circ 39 66$ , though this star is only of 9.2 mag.

4226. In the original note-book this is described as "G. 3057 (o. ed.)," with another  $5^s$  following. This means that the observer set for No. 3057 of the suppressed edition of Groombridge's catalogue\* or G. 2988 = Radcliffe 4524, and the wire transits have indeed been reduced with  $\delta = 43^\circ 50'$ . A sketch made agrees with the relative positions of  $+43^\circ 34 22 - 23 - 25$ . For some unknown reason the two stars observed were afterwards taken to be an anonyma and P. xix. 354 in P.D.  $52^\circ$ ! Properly reduced we get for 1840

$$\begin{array}{rcccl} & h & m & s & \\ 4226 & 19 & 51 & 40 \cdot 39 & 46 \cdot 9 \\ 4228a & & 51 & 45 \cdot 67 & 46 \cdot 5 \end{array} \left. \vphantom{\begin{array}{rcccl} & h & m & s & \\ 4226 & 19 & 51 & 40 \cdot 39 & 46 \cdot 9 \\ 4228a & & 51 & 45 \cdot 67 & 46 \cdot 5 \end{array}} \right\} \text{Epoch } 1842 \cdot 638.$$

4228. The first result in R.A. to be struck out, seconds  $= 45^s 20$ , epoch  $1850 \cdot 997$ .

4230 follows  $10^s$  after 4228, and is therefore  $= +38^\circ 38 36$ . For 1840

$$19^h 51^m 55^s \cdot 31 \quad 52^\circ 1'.$$

$$4231 = 4230 = \text{L.L. } 38172 = 4233.$$

4360. For 1844 October 28 read August 28.

4361. Observed  $1^s 28$  p 4360, therefore  $= +9^\circ 45 07 = \text{B.W. } 20^h 400$ .

$$20^h 15^m 44^s \cdot 95 \quad 80^\circ 6'.$$

4388. Two different stars. Minutes of R.A. should be 20 (obvious error of obs.), and its P.D. is  $60^\circ 9' 3 (= +29^\circ 40 38)$ . The R.A. of the star observed in P.D. is  $20^h 22^m 39^s (= +29^\circ 40 55)$ .

4421. The R.A. is that of  $+34^\circ 40 82$ , P.D.  $55^\circ 12'$ , but the star observed in P.D. was  $1' 56'' 16$  south of 47 *Cygni* and is described as "very faint companion." It must have been  $+34^\circ 40 76$ , 9.5 mag.,  $16^s$  p,  $1' 3$  south, R.A.  $= 20^h 27^m 24^s$ .

4579 and 4580. "Two of same R.A.," therefore  $= +55^\circ 25 29 - 30$ , R.A.  $= 21^h 3^m 51^s$  and  $52^s$ .

4593. Minutes of P.D. are 27. Prec. in R.A. is  $1^s 50 8$  (misprint).

4636. Dr. Ristenpart suggests that the P.D. was  $71^\circ 36'$  and the star  $= +18^\circ 47 72$ .

\* About this see p. v of the published Catalogue. There is a copy of it in the library of Armagh Observatory.

4641. Degrees of P.D. are 100 (misprint).

4645. Must be  $= +36^{\circ}45'22$ , R.A.  $21^{\text{h}}14^{\text{m}}6^{\text{s}}$ , seconds  $18''90$ .

4646. Must be  $= +36^{\circ}45'34$ , R.A.  $21^{\text{h}}15^{\text{m}}58^{\text{s}}$ , seconds  $25''28$ .

4673. Minutes of P.D. are 17.

4678=P. xxi. 158=B.A.C. 7473. Minutes should be  $22^{\text{m}}$ , error of obs.

4790. Measured by micrometer  $+1'43''30$  from 4789, is therefore south of the latter. The observer at first thought he had observed 4785 (no degrees or minutes recorded!) and a comes, hence the erroneous position of 4790. It is

$$+53^{\circ}27'41, 21^{\text{h}}49^{\text{m}}42^{\text{s}}, 36^{\circ}51'8''27.$$

4793. I cannot explain how the P.D.  $16^{\circ}54' \pm$  was made out, as the wire transits have been reduced with P.D.  $18^{\circ}45'$ , and thus the five wires observed agree very well indeed. The constants of 79 *Draconis* (or a star near it) were used, and an error of  $1^{\text{s}}$  was made. In the original the minute observed is recorded as 50 with a 1 written over the 0, and the 0 has been adopted, which happens to be wrong. It is  $+71^{\circ}10'97$ =Radcliffe 5473, and reduced anew it becomes  $21^{\text{h}}50^{\text{m}}41^{\text{s}}12$  (Prec.  $+0^{\text{s}}966$ ),  $18^{\circ}46'$ . ~~4794.~~

4798. Must be  $-13^{\circ}60'72$ , R.A.  $21^{\text{h}}52^{\text{m}}15^{\text{s}}$  (9.2 mag.).

4808. If minutes of R.A. are taken as 52 instead of 53, the R.A. agrees with that of Leipzig II. 11065  $= +7^{\circ}47'77$ , P.D.  $82^{\circ}54'$ . Observed for 19 *Pegasi*.

4810. Minutes of P.D. are 42 (misprint).

4830. R.A. is  $22^{\text{h}}0^{\text{m}}20^{\text{s}}$  ( $= +62^{\circ}20'30$ ).

4845. Dr. Ristenpart suggests that the P.D. was  $95^{\circ}43'$  instead of  $94^{\circ}40' \pm$ , as the star must have been B.W.  $22^{\text{h}}29' = -5^{\circ}57'20$ .

4855. } The first is Bradley 2935=G. 3707, the second is  
4858. }

G. 3709. On 1844 October 10 the observer says "the preceding star," but a diagram shows the following star bisected on the horizontal wire. On 1850 November 27 he adds "took the brightest." The preceding star is the brightest, and, no doubt, it was observed on the other occasions when no note was made. The P.D.'s of 4855 and 4858 are therefore to be interchanged, after which they will be in excellent accordance with Radcliffe, Greenwich, and  $\Sigma$  2873.

4918. P.D. should be  $48^{\circ}44'53''44$ .

4960. Must be  $= +12^{\circ}48'43$ , P.D.  $77^{\circ}25'$ .

4964=4966=L.L. 44154.

4968=4969.

4971. Stated by observer to follow 4960, therefore  $= +12^{\circ}48'49$ , P.D.  $77^{\circ}21'$ .

5080. See p. 613. I cannot identify this star: it was measured by micrometer  $+3'37''21$  (south) from 1 Andromedæ. It is called a "comes," but as usual there is not a word about the magnitude nor about the difference of R.A.  $+41^{\circ}46'60$  (9.4 mag.) is  $1^{\text{m}}40^{\text{s}}$  p 1 Androm.,  $3'5$  north.



5114. Must be several minutes preceding B. 3077, as it was observed in the usual way with four microscopes before B. 3077 came into the field. It is therefore  $= +56^{\circ} 29' 52''$ , R.A.  $23^{\text{h}} 1^{\text{m}} 30^{\text{s}}$ . How the R.A. of this and other anonymous stars came to be given to a second in the Catalogue, though only given roughly to the nearest minute in the "observed places," is altogether a mystery.

5141. Must be G. 4025, which is  $1^{\text{m}} 45^{\text{s}}$  p and  $1' 50''$  north of G. 4029. The former was observed on the fixed wire with four microscopes, and the latter was measured with the micrometer,  $\Delta\delta = 1' 16'' 97$ . I can only suppose that the instrument was accidentally displaced after setting on the first star and before setting on the second star. This would explain why the place of the first star is wrong, while that of the second is right.

5177. Measured from 4 *Cassiopeiae*, minutes of P.D. should be 36. On November 17 it is called "preceding, 9 mag.," on November 20 only "comes."  $+61^{\circ} 24' 48''$  is the only star, but it follows 4 *Cassiopeiae*  $58^{\text{s}}$ ,  $1' 2''$  south, R.A. being  $23^{\text{h}} 18^{\text{m}} 44^{\text{s}}$ .

5190. Observed with 5193, "preceding, exactly bisected, 7 mag." No  $\Delta\alpha$  given. Not mentioned on the other nights when 5193 was observed, and looked for in vain in 1859 and 1865. It must have been a minor planet, the magnitude may have been exaggerated.

5295. Minutes of P.D. are 19, error of reduction, R.A.  $= 23^{\text{h}} 49^{\text{m}} 50^{\text{s}}$ .

5322. Minutes of R.A. are 54, it follows  $2^{\text{s}} 49$  after B. 3202.

5338. Degrees of P.D. are 86.

5339 }  
5340 } Are mere repetitions of 4154 and 4357.

Finally, in the Appendix, p. 828,  $\beta$  *Cassiopeiae*, the minutes of P.D. should be 43.

*Note on Mr. Bryan Cookson's Paper, "On the Accuracy of Eye Observations of Meteors and the Determination of their Radiant Points."* By H. C. Plummer, M.A.

1. Mr. Cookson's paper must be regarded as a welcome and valuable attempt to deal with a question of great importance and interest. It is the more necessary, therefore, to point out an error which occurs in his theory. The correction is offered here with no idea of detracting from the merit of the author's contribution, and it is believed that his oversight in no way affects the validity of his general conclusions.

2. The error occurs in the expression which Mr. Cookson obtains for the weight of an equation. The result ought to be simplified by the suppression of the Q term. It seems clear on general grounds that the weight ought to be independent of the